Navajo Nation Mapped Underground Abandoned Uranium Mines (AUMs)

Data format: Shapefile

File or table name: NN_AUM_Poly_Undrgnd

Coordinate system: Geographic

Theme keywords: Abandoned Uranium Mines, Mapped Underground Extents, Ore Body Extents, Estimated Underground Extents

Abstract: This is a polygon shapefile of 365 mapped underground abandoned uranium mines (AUMs) for the six Abandoned Uranium (AUM) Regions on or within one mile of the Navajo Nation. The attributes identify the Mine ID, primary mine name, alias mine names, reference sources for these names, perimeter, area, acres, comments related to AUM, and a reference(s) for the underground AUM extent.

FGDC and ESRI Metadata:

Metadata elements shown with blue text are defined in the Federal Geographic Data Committee's (FGDC) *Content Standard for Digital Geospatial Metadata (CSDGM)*. Elements shown with green text are defined in the *ESRI Profile of the CSDGM*. Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog. ArcCatalog adds hints indicating which FGDC elements are mandatory; these are shown with gray text.

Identification Information:

Citation:

Citation information:

Originators: TerraSpectra Geomatics

Title:

Navajo Nation Mapped Underground Abandoned Uranium Mines (AUMs)

***File or table name:** NN_AUM_Poly_Undrgnd

Publication date: July 2007

***Geospatial data presentation form:** vector digital data

Publication information:
Publication place: San Francisco, CA
Publisher: U. S. Environmental Protection Agency, Region 9, Superfund Program

***Online linkage:**
\\Terra_dc\Navajo\NAUM_NN_Summary\DB\AUM\NN_AUM_Poly_Undrgnd.shp

Description:
Abstract:
This is a polygon shapefile of 365 mapped underground abandoned uranium mines (AUMs) for the six Abandoned Uranium (AUM) Regions on or within one mile of the Navajo Nation. The attributes identify the Mine ID, primary mine name, alias mine names, reference sources for these names, perimeter, area, acres, comments related to AUM, and a reference(s) for the underground AUM extent.

Purpose:
This dataset was developed to support the U.S. Environmental Protection Agency (USEPA) in its undertaking of an extensive scientific study to determine if abandoned uranium mines (AUM) and related mine features pose a significant risk to human health and the environment, and to identify areas requiring action to reduce risk for the Navajo Nation.

***Language of dataset:** en

Time period of content:
Time period information:
Single date/time:
Calendar date: July 2007

Currentness reference:
publication date

Status:
Progress: Complete
Maintenance and update frequency: None planned

Spatial domain:
Bounding coordinates:
***West bounding coordinate:** -110.445166
***East bounding coordinate:** -107.839830
***North bounding coordinate:** 37.248225
***South bounding coordinate:** 35.331205

Local bounding coordinates:
***Left bounding coordinate:** -110.445166
***Right bounding coordinate:** -107.839830
***Top bounding coordinate:** 37.248225
***Bottom bounding coordinate:** 35.331205

Keywords:
Theme:
Theme keywords: Abandoned Uranium Mines, Mapped Underground Extents, Ore Body Extents, Estimated Underground Extents
Theme keyword thesaurus: None

Place:

Place keywords: Navajo Nation, Arizona, New Mexico, Utah, United States
Place keyword thesaurus: None

Stratum:
Stratum keywords: Underground

Access constraints: None
Use constraints:
This is a polygon shapefile of mapped underground abandoned uranium mines (AUMs) on or within one mile of the Navajo Nation for the six AUM Regions. Not all AUMs with underground mining are captured here because all AUMs were not mapped underground or made available through the published literature.

Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

The data are provided "as-is," without warranty of any kind, either express or implied.

These data have been compiled as part of a desktop project to collect existing spatial data to support the study of Navajo abandoned uranium mines. No field verifications were undertaken as part of this desktop study.

Point of contact:
Contact information:
Contact organization primary:
Contact organization: U. S. Environmental Protection Agency, Region 9, Superfund Program

Contact address:
Address type: mailing and physical address
Address:
75 Hawthorne St (SFD 8-2)
City: San Francisco
State or province: CA
Postal code: 94105
Country: USA

Contact voice telephone: 415-972-3167

Security information:
Security classification system: None

***Native dataset format:** Shapefile
***Native data set environment:**
Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.1.0.780

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Data Quality Information:

Attribute accuracy:
Attribute accuracy report:
Attributes values were visually inspected for consistency with source reference

documents.

Completeness report:

This is a polygon shapefile of mapped underground abandoned uranium mines (AUMs) on or within one mile of the Navajo Nation for the six AUM Regions. Not all AUMs with underground mining are captured here because all AUMs were not mapped underground or made available through the published literature.

Positional accuracy:

Horizontal positional accuracy:

Horizontal positional accuracy report:

The mapped underground AUMs were automated from scanned maps, figures, and plates from literature sources that typically contained minimal information useful to georeferencing. Maps were georeferenced using USGS DOQQs and DRGs as the base along with the Navajo Abandoned Mine Lands Reclamation Program (NAMLRP) mine site feature (adits, pits, etc. found in S06220502.shp) positions. Additionally, the Excess Bismuth 214 radiation contours (NC_Excess_Bi214.shp), and NAMLRP field books and field sketch books were additionally used to help georeference each scanned map. In some cases other multiple maps of a given underground mine were available and were used synergistically to develop an underground AUM polygon. An automated underground mine polygon was generally digitzed along the outside boundary of an underground mine polygon.

Because of this process there is no numerically determined positional accuracy, however, the best accuracy would likely be no better than the positional accuracy of a USGS 1:100,000 scale topographic map (~167 feet).

Lineage:

Process step:

Process description:

NORTHERN AUM REGION
==========

The mapped underground AUMs were automated from scanned maps, figures, and plates from literature sources. The sources may be identifed using the "Ugrnd_Skey" field that lists the Skey references used in creating each Underground AUM polygon.

These maps typically contained minimal information useful to georeferencing, therefore multiple sources were used to create a georeferenced scanned map that could be used to digitize the generalized outline of a mapped underground AUM.

Maps were georeferenced using primarily USGS DOQQs and DRGs along with the Navajo Abandoned Mine Lands Reclamation Program (NAMLRP) mine site feature (adits, pits, etc. found in S06220502.shp) positions.

Those underground AUMs, where the use of the DOQQs and/or DRGs was critical to the positioning of the underground AUM polygon, are identified with DRG or DOQQ in the "Ugrnd_Skey" field. USGS DOQQs and DRGs are provided as part of the GIS database for this project.

All underground AUM polygons benefitted from the NAMLRP mine site feature (adits, pits, etc.) positions. The Skey reference for this point shapefile is S06220502, and the shape file is provided as a reference in the form of the shapefile, S06220502.shp within the references area of the GIS database.

Bismuth 214 is a daughter product in the uranium decay series. The airborne multispectral gamma radiation survey flown by the US Department of Energy's Remote Sensing Laboratory mapped the extent of this isotope in many parts of this AUM region. Where "Rad" is identified in the "Ugrnd_Skey" field the Bismuth214.shp shapefile that shows Excess Bismuth 214 contours was used to help identify the position of mine portals with adjacent waste piles. Bismuth214.shp is provided as part of this GIS database.

NAMLRP field books and field sketch books were often used to help georeference each scanned map. The field books and field sketch books often provided information on absolute and relative distances between mine portals, which features were the primary mine portals to an underground mine, and other pertinent geographic information. Where these were used they are identified by Skey in the "Ugrnd_Skey" field.

In some cases the field books and sketch books along with other reference sources indicated the mis-positioning of some mine features or AUM polygons. These mine site features were repositioned within the AUM_Pts.shp shapefile that is part of this GIS database. The appropriate Skey references were added to the LCTN_SRC field in AUM_Pts.shp. Similarly, some surface AUM polygons were repositioned or changed in shape. The appropriate Skey references were added to the Poly_Skey field in the AUM_Polys.shp shapefile.

Not all AUMs with underground mining were mapped or the maps may not have been published. Therefore this dataset provides polygons for underground AUMs based on available information. From the literature it is known that some AUMs were mined underground but there is no mapped underground AUM polygon.

Process software and version: ESRI ArcGIS 9.1
Process date: December 2005

Source used citation abbreviation:
N_AUM_Poly_Undrgnd.shp

Process contact:
Contact information:
Contact organization primary:
Contact organization: TerraSpectra Geomatics

Contact address:
Address type: mailing and physical address
Address:
2700 E Sunset Rd, Ste A-10
City: Las Vegas
State or province: NV
Postal code: 89120
Country: USA

Process step:
Process description:
WESTERN AUM REGION
==========

None Mapped Underground.

Process step:

Process description:

NORTH CENTRAL AUM REGION

==========

The mapped underground AUMs were automated from scanned maps, figures, and plates from literature sources. The sources may be identifed using the "Ugrnd_Skey" field that lists the Skey references used in creating each Underground AUM polygon.

These maps typically contained minimal information useful to georeferencing, therefore multiple sources were used to create a georeferenced scanned map that could be used to digitize the generalized outline of a mapped underground AUM.

Maps were georeferenced using primarily USGS DOQQs and DRGs along with the Navajo Abandoned Mine Lands Reclamation Program (NAMLRP) mine site feature (adits, pits, etc. found in S06220502.shp) positions.

Those underground AUMs, where the use of the DOQQs and/or DRGs was critical to the positioning of the underground AUM polygon, are identified with DRG or DOQQ in the "Ugrnd_Skey" field. USGS DOQQs and DRGs are provided as part of the GIS database for this project.

All underground AUM polygons benefitted from the NAMLRP mine site feature (adits, pits, etc.) positions. The Skey reference for this point shapefile is S06220502, and the shape file is provided as a reference in the form of the shapefile, S06220502.shp within the references area of the GIS database.

Bismuth 214 is a daughter product in the uranium decay series. The airborne multispectral gamma radiation survey flown by the US Department of Energy's Remote Sensing Laboratory mapped the extent of this isotope in many parts of this AUM region. Where "Rad" is identified in the "Ugrnd_Skey" field the Bismuth214.shp shapefile that shows Excess Bismuth 214 contours was used to help identify the position of mine portals with adjacent waste piles. Bismuth214.shp is provided as part of the GIS database.

NAMLRP field books and field sketch books were often used to help georeference each scanned map. The field books and field sketch books often provided information on absolute and relative distances between mine portals, which features were the primary mine portals to an underground mine, and other pertinent geographic information. Where these were used they are identified by Skey in the "Ugrnd_Skey" field.

In some cases the field books and sketch books along with other reference sources indicated the mis-positioning of some mine features or AUM polygons. These mine site features were repositioned within the NC_AUM_Pt_Features.shp shapefile that is part of this GIS database. The appropriate Skey references were added to the LCTN_SRC field in NC_AUM_Pt_Features.shp. Similarly, some surface AUM polygons were repositioned or changed in shape. The appropriate Skey references were added to the Poly_Skey field in the NC_AUM_Poly_Surf.shp shapefile.

Not all AUMs with underground mining were mapped or the maps may not have been published. Therefore this dataset provides polygons for underground AUMs based on available information. From the literature it is known that some AUMs were mined underground but no figure or map was published to show the extent of underground workings, therefore, there is no mapped underground AUM polygon.

Process software and version: ESRI ArcGIS 9.1
Process date: June 2006

Source used citation abbreviation:
NC_AUM_Poly_Undrgnd.shp

Process contact:
Contact information:
Contact organization primary:
Contact organization: TerraSpectra Geomatics

Contact address:
Address type: mailing and physical address
Address:
2700 E Sunset Rd, Ste A-10
City: Las Vegas
State or province: NV
Postal code: 89120
Country: USA

Contact voice telephone: 702-795-8254

Process step:
Process description:
CENTRAL AUM REGION
==========

None Mapped Underground.

Process step:
Process description:
SOUTHERN AUM REGION
==========

None Mapped Underground.

Process step:
Process description:
EASTERN AUM REGION
==========

The mapped underground AUMs were automated from scanned maps, figures, and plates from literature sources. The sources may be identifed using the "Ugrnd_Skey" field that lists the Skey references used in creating each Underground AUM polygon.

These maps typically contained minimal information useful to georeferencing, therefore multiple sources were used to create a georeferenced scanned map that could be used to digitize the generalized outline of a mapped underground AUM.

Maps were georeferenced using primarily USGS DOQQs and DRGs along with the mine site feature (adits, pits, etc. found in S06220502.shp) positions.

Those underground AUMs, where the use of the DOQQs and/or DRGs was critical to the positioning of the underground AUM polygon, are identified with DRG or

DOQQ in the "Ugrnd_Skey" field. USGS DOQQs and DRGs are provided as part of the GIS database for this project.

Some underground AUM polygons benefitted from the NAMLRP mine site feature (adits, pits, etc.) positions. The Skey reference for this point shapefile is S06220502, and the shape file is provided as a reference in the form of the shapefile, S06220502_NAMLRP_2004.shp within the DB/AUM area of the GIS database.

Not all AUMs with underground mining were mapped and for some the maps may not have been published. Therefore this dataset provides polygons for underground AUMs based on available information. From the literature it is known that some AUMs were mined underground but no figure or map was published to show the extent of underground workings, therefore, there is no mapped underground AUM polygon.

Process software and version: ESRI ArcGIS 9.1
Process date: October 2006

Source used citation abbreviation:
E_AUM_Poly_Undrgnd.shp

Process contact:
Contact information:
Contact organization primary:
Contact organization: TerraSpectra Geomatics

Contact address:
Address type: mailing and physical address
Address:
2700 E Sunset Rd, Ste A-10
City: Las Vegas
State or province: NV
Postal code: 89120
Country: USA

Contact voice telephone: 702-795-8254

Process step:
Process description:
FINAL NAVAJO NATION COMPILATION OF SIX AUM REGIONS WITH UPDATES
==========

The three underground AUM polygon shapefiles for each AUM Region were compiled into a single shapefile, NN_AUM_Poly_Undrgnd.shp.

Two new underground AUM polygons were added (Mine_ID 1038 and 1039).

Mine_IDs were changed for 24 underground AUM polys to reflect the change in Mine_IDs for the surface AUM polygons.

495, 496, and 504 (19 polygons) to 501.
499 and 503 to 501 (two polygons)
502 to 497 (one polygon)
645 to 478 (one polygon)
1031 to 363 (one polygon)

The single underground AUM polygon, Mine_ID 305 was split into two, creating Mine_ID 303 and leaving a smaller Mine_ID 305.

Process software and version: ESRI ArcGIS 9.1
Process date: July 2007

Source used citation abbreviation:
N_AUM_Poly_Undrgnd.shp
Source used citation abbreviation:
NC_AUM_Poly_Undrgnd.shp
Source used citation abbreviation:
E_AUM_Poly_Undrgnd.shp
Source produced citation abbreviation:
NN_AUM_Poly_Undrgnd.shp

Process contact:
Contact information:
Contact organization primary:
Contact organization: TerraSpectra Geomatics

Contact address:
Address type: mailing and physical address
Address:
2700 E Sunset Rd, Ste A-10
City: Las Vegas
State or province: NV
Postal code: 89120
Country: USA

Contact voice telephone: 702-795-8254

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Spatial Data Organization Information:

*__Direct spatial reference method:__ Vector

Point and vector object information:
SDTS terms description:
*__Name:__ NN_AUM_Poly_Undrgnd
*__SDTS point and vector object type:__ G-polygon
*__Point and vector object count:__ 365

ESRI terms description:
*__Name:__ NN_AUM_Poly_Undrgnd
*__ESRI feature type:__ Simple
*__ESRI feature geometry:__ Polygon
*__ESRI topology:__ FALSE
*__ESRI feature count:__ 365
*__Spatial index:__ FALSE
*__Linear referencing:__ FALSE

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Spatial Reference Information:

Horizontal coordinate system definition:

Coordinate system name:

*__Geographic coordinate system name:__ GCS_North_American_1983

Geographic:

*__Latitude resolution:__ 0.000000
*__Longitude resolution:__ 0.000000
*__Geographic coordinate units:__ Decimal degrees

Geodetic model:

*__Horizontal datum name:__ North American Datum of 1983
*__Ellipsoid name:__ Geodetic Reference System 80
*__Semi-major axis:__ 6378137.000000
*__Denominator of flattening ratio:__ 298.257222

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Entity and Attribute Information:

Detailed description:

*__Name:__ NN_AUM_Poly_Undrgnd

Entity type:

*__Entity type label:__ NN_AUM_Poly_Undrgnd
*__Entity type type:__ Feature Class
*__Entity type count:__ 365
Entity type definition:
Underground AUM Polygons

Attribute:

*__Attribute label:__ FID
*__Attribute alias:__ FID
*__Attribute definition:__
Internal feature number.
*__Attribute definition source:__
ESRI

*__Attribute type:__ OID
*__Attribute width:__ 4
*__Attribute precision:__ 0
*__Attribute scale:__ 0

Attribute domain values:

*__Unrepresentable domain:__
Sequential unique whole numbers that are automatically generated.

Attribute:

*__Attribute label:__ Shape
*__Attribute alias:__ Shape
*__Attribute definition:__

Feature geometry.

* **Attribute definition source:**
  ESRI

* **Attribute type:** Geometry
* **Attribute width:** 0
* **Attribute precision:** 0
* **Attribute scale:** 0

Attribute domain values:

* **Unrepresentable domain:**
  Coordinates defining the features.

Attribute:

* **Attribute label:** Mine_ID
* **Attribute alias:** Mine_ID

* **Attribute type:** Number
* **Attribute width:** 4

Attribute:

* **Attribute label:** Mine_Name
* **Attribute alias:** Mine_Name

* **Attribute type:** String
* **Attribute width:** 50

Attribute:

* **Attribute label:** NameSource
* **Attribute alias:** NameSource

* **Attribute type:** String
* **Attribute width:** 45

Attribute:

* **Attribute label:** Aliases
* **Attribute alias:** Aliases

* **Attribute type:** String
* **Attribute width:** 125

Attribute:

* **Attribute label:** Alias_Src
* **Attribute alias:** Alias_Src

* **Attribute type:** String
* **Attribute width:** 60

Attribute:

* **Attribute label:** Area
* **Attribute alias:** Area

* **Attribute type:** Number
* **Attribute width:** 19
* **Attribute number of decimals:** 2

Attribute:
*__Attribute label:__ Comments
*__Attribute alias:__ Comments

*__Attribute type:__ String
*__Attribute width:__ 200

Attribute:
*__Attribute label:__ Ugrnd_Skey
*__Attribute alias:__ Ugrnd_Skey

*__Attribute type:__ String
*__Attribute width:__ 100

Attribute:
*__Attribute label:__ Type
*__Attribute alias:__ Type

*__Attribute type:__ String
*__Attribute width:__ 50

Overview description:
Dataset overview:
There are 365 mapped underground AUMs in this polygon shapefile.

Entity and attribute overview:
There are 9 thematic attributes that include:

Mine_ID - the unique numeric ID field that is also the relate field that will tie to the same field name in AUM_Polys.shp, AUMs_Aggregated.shp, and Scoring_Analysis.xls
Mine_Name - primary mine name
NameSource - Skey reference(s) for the primary mine name
Aliases - alias(es) or secondary mine name
Alias_Src - Skey reference(s) for the aliases
Area - the area in square meters of the underground AUM
Comments - comments about the underground AUM
Ugrnd_Skey - the Skey reference(s) used to define the underground AUM polygon
Type - Type of underground AUM feature, including:

• Mapped underground mine - mined area from automated underground mine map (may be larger because mine maps are not known to be final mine maps)
• Ore body extent - ore body extent in which an underground mine operated (actual mined area may be larger or smaller)
• Estimated underground mine - ore body extent estimated from a published description of the dimensions of an underground mine

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Distribution Information:

Distributor:
Contact information:
Contact organization primary:
Contact organization: U. S. Environmental Protection Agency, Region 9,

Superfund Records Center

Contact address:
Address type: mailing address
Address:
95 Hawthorne St (SFD-7C)
City: San Francisco
State or province: CA
Postal code: 94105
Country: USA

Contact voice telephone: 415-536-2033

Resource description: NN_AUM_Poly_Undrgnd.shp

Distribution liability:
Although these data have been processed successfully on a computer system for the USEPA, no warranty expressed or implied is made by the USEPA or its contractors regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. No responsibility is assumed by USEPA or its contractors in the use of these data.

Standard order process:
Digital form:
Digital transfer information:
***Transfer size:** 0.191
***Dataset size:** 0.191

Custom order process:
Contact the USEPA for a custom order.
Technical prerequisites:
Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

Available time period:
Time period information:
Single date/time:

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Metadata Reference Information:

***Metadata date:** 20070730

***Language of metadata:** en

Metadata contact:
Contact information:
Contact person primary:
Contact person: Andrew Bain
Contact organization: U. S. Environmental Protection Agency, Region 9, Superfund Program
Contact position: Project Manager

Contact address:
Address type: mailing and physical address
Address:
75 Hawthorne St (SFD 8-2)
City: San Francisco
State or province: CA
Postal code: 94105
Country: USA

Contact voice telephone: 415-972-3167

***Metadata standard name:** FGDC Content Standards for Digital Geospatial Metadata
***Metadata standard version:** FGDC-STD-001-1998
***Metadata time convention:** local time

Metadata access constraints: None.
Metadata use constraints:
None.

Metadata security information:
Metadata security classification system: None

Metadata extensions:
***Online linkage:** http://www.esri.com/metadata/esriprof80.html
***Profile name:** ESRI Metadata Profile

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Binary Enclosures:

Thumbnail:
Enclosure type: Picture

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